Eskom

Ms Mpho Nembilwi
Nkangala District Municipality
PO BOX 437
MIDDLEBURG
1050

Date:
30 January 2021

Enquiries:
Livhuwani Tshilate
017 615 2317

Ref*:* 17/4/AEL/MP312/11/09

Dear Ms Nembilwi

KRIEL POWER STATION'S MONTHLY STACK EMISSIONS REPORT FOR THE MONTH OF DECEMBER 2020

This serves as the monthly report required in terms of Section 7.4 in Kriel Power Station's Atmospheric Emission License 17/4/AEL/MP312/11/09. The emissions are for the month of December 2020. Verified emissions of particulates matter, SO_2 and NO_x (as NO_2) are also included.

Raw Materials and Products

Table 1: Quantity of Raw Materials and Products used/produced for the month of December 2020

Raw Materials and Products used	Raw Material Type	Units	Maximum Permitted Consumption / Rate (Quantity)	Consumption / Rate in Month of December 2020
	Coal	Tons/month	1 227 600	497 354
	Fuel Oil	Tons/month	5 000	2 968.44
Production Rates	**Product/ By-Product Name**	**Unit**	**Maximum Production Capacity Permitted (Quantity)**	**Production Rate in Month of December 2020**
	Ash	Tons/month	not specified	667.5
	RE PM	kg/MWh	not specified	0.70

1/…

Abatement Technology

Table 2: Abatement Equipment Control Technology for December 2020.

Associated Unit/Stack	Technology Type	Actual Efficiency (%) December 2020
Unit 1	ESP	99.21%
Unit 2	ESP	98.88%
Unit 3	ESP	Outage
Unit 4	ESP	99.66%
Unit 5	ESP	99.68%
Unit 6	ESP	Outage

Energy Source Characteristics

Table 3: Energy Source Material Characteristics for the month of December 2020

Characteristic	Stipulated Range (Unit)	Monthly Average Content
Sulphur Content	0.6-1.2 (%)	0.72
Ash Content	21-36 (%)	25.65

Monthly Monitor Reliability

Associated Unit/Stack	PM (%)	SOx (%)	NOx (%)
North	75.1%	99.9 %	99.9%
South	99.7%	99.9%	99.9%

Emissions Reporting

GRAPH LEGEND	
	Final daily emissions average in mg/Nm3 released within a particular day
	Final monthly emissions average in mg/Nm3 released within the whole month
	Emissions limit as per the AEL

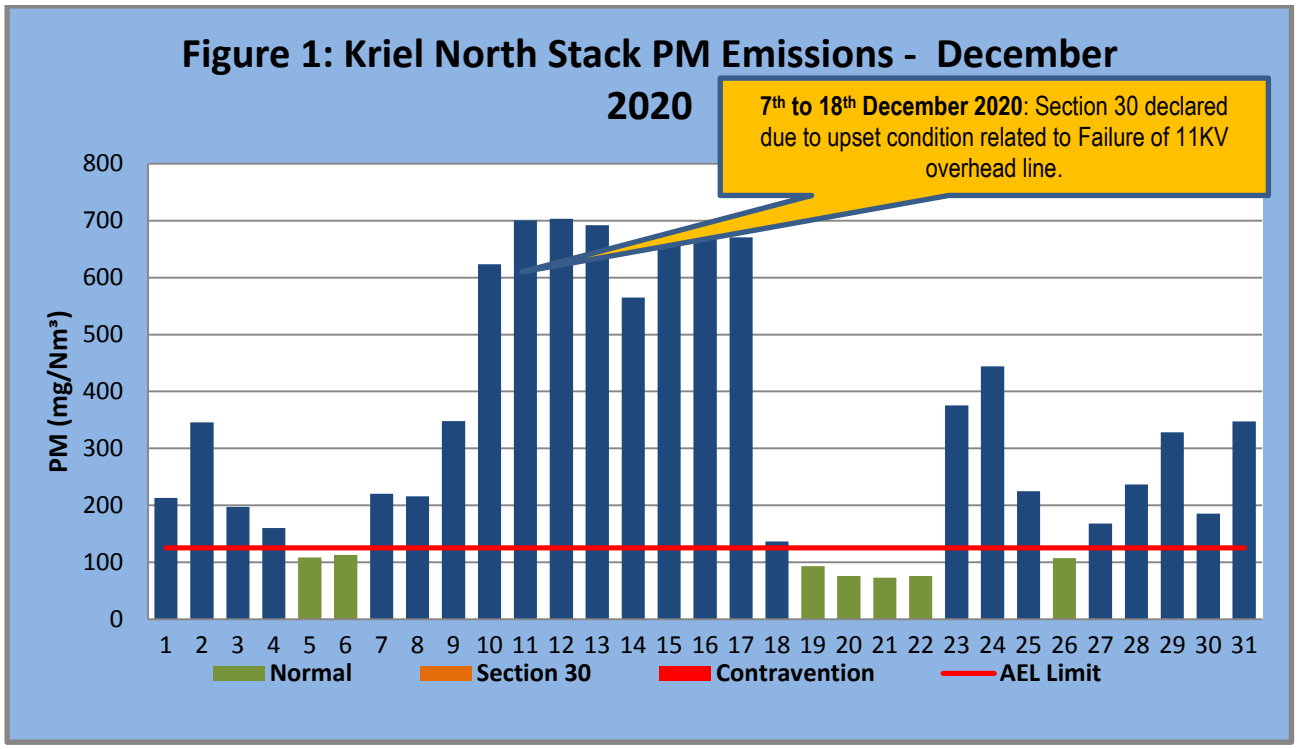

Figure 1: PM emissions (daily averages) for the month of December 2020 against emission limit for the North Stack

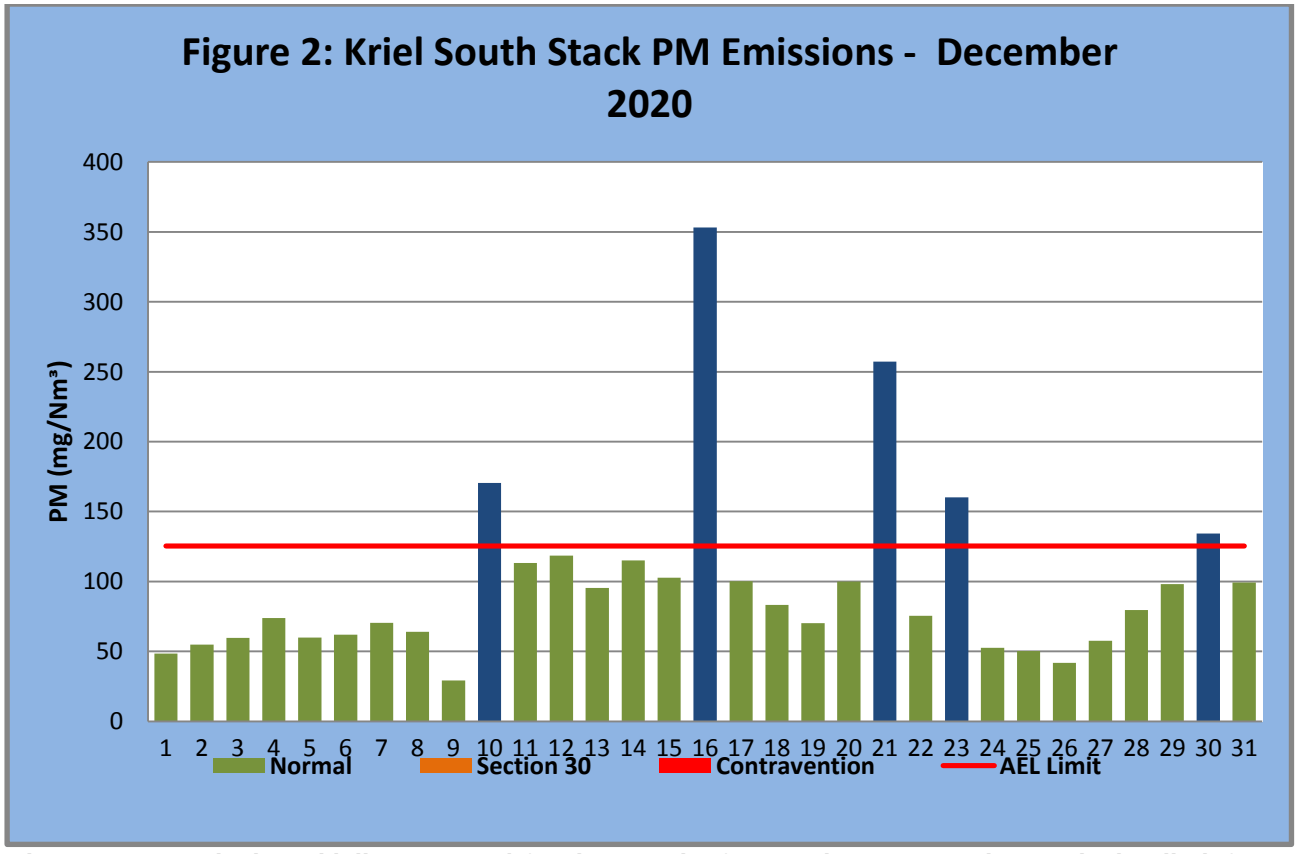

Figure 2: PM emissions (daily averages) for the month of December 2020 against emission limit for the South Stack

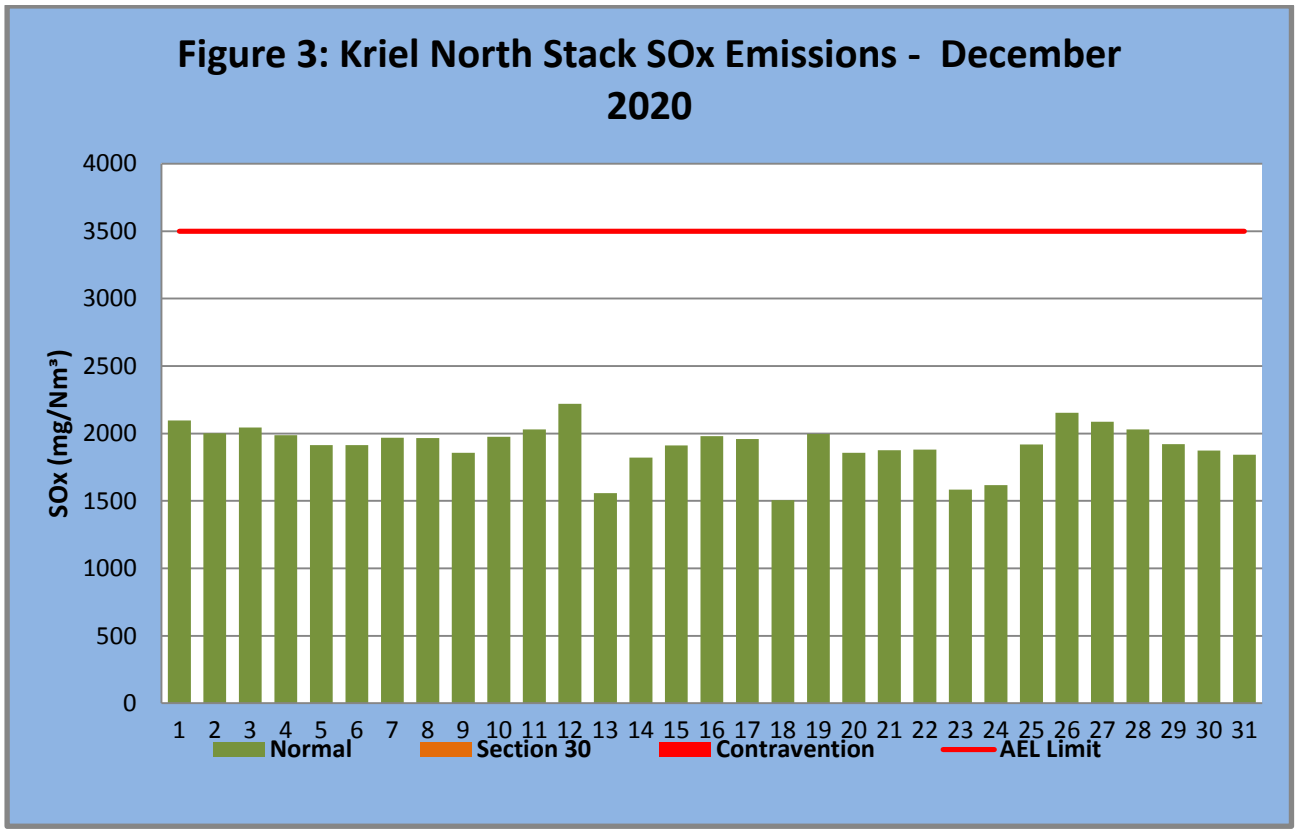

Figure 3. SO2 emissions (daily averages) for the month of December 2020 against emission limit for the North Stack. The SOx Limit is 3500mg/Nm3.

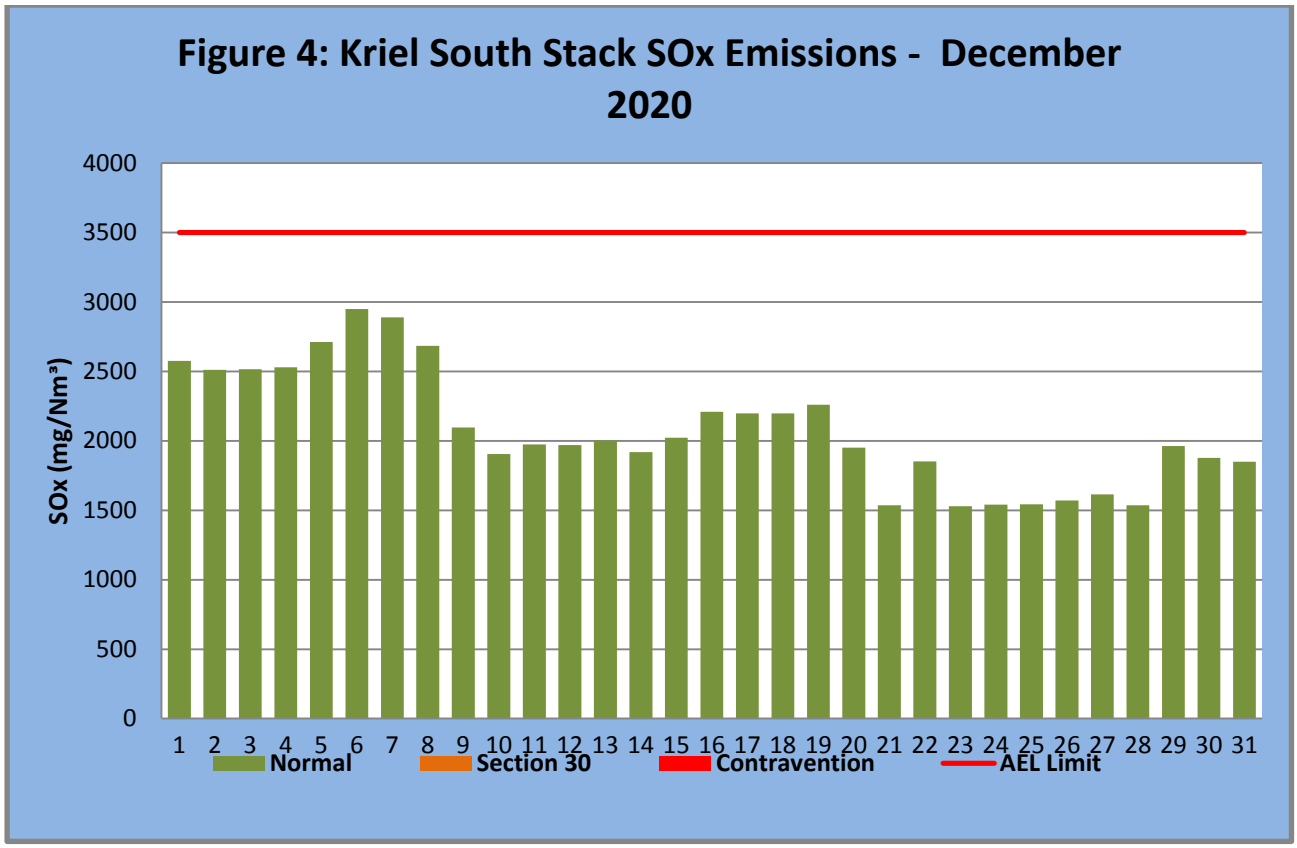

Figure 4. SO2 emissions (daily averages) for the month of December 2020 against emission limit for the South Stack. The SOx Limit is 35000mg/Nm3.

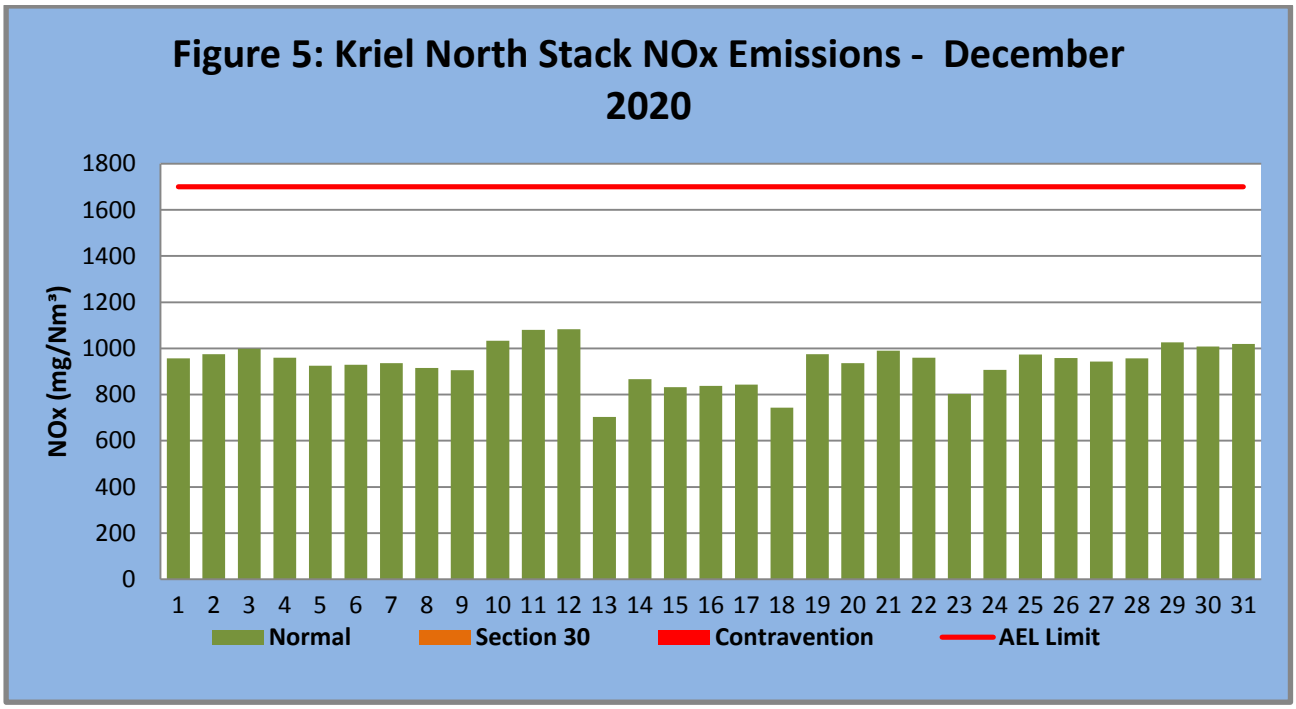

Figure 5. NO2 emissions (daily averages) for the month of December 2020 against emission limit for the North Stack. The NOx Limit is 1600mg/Nm3.

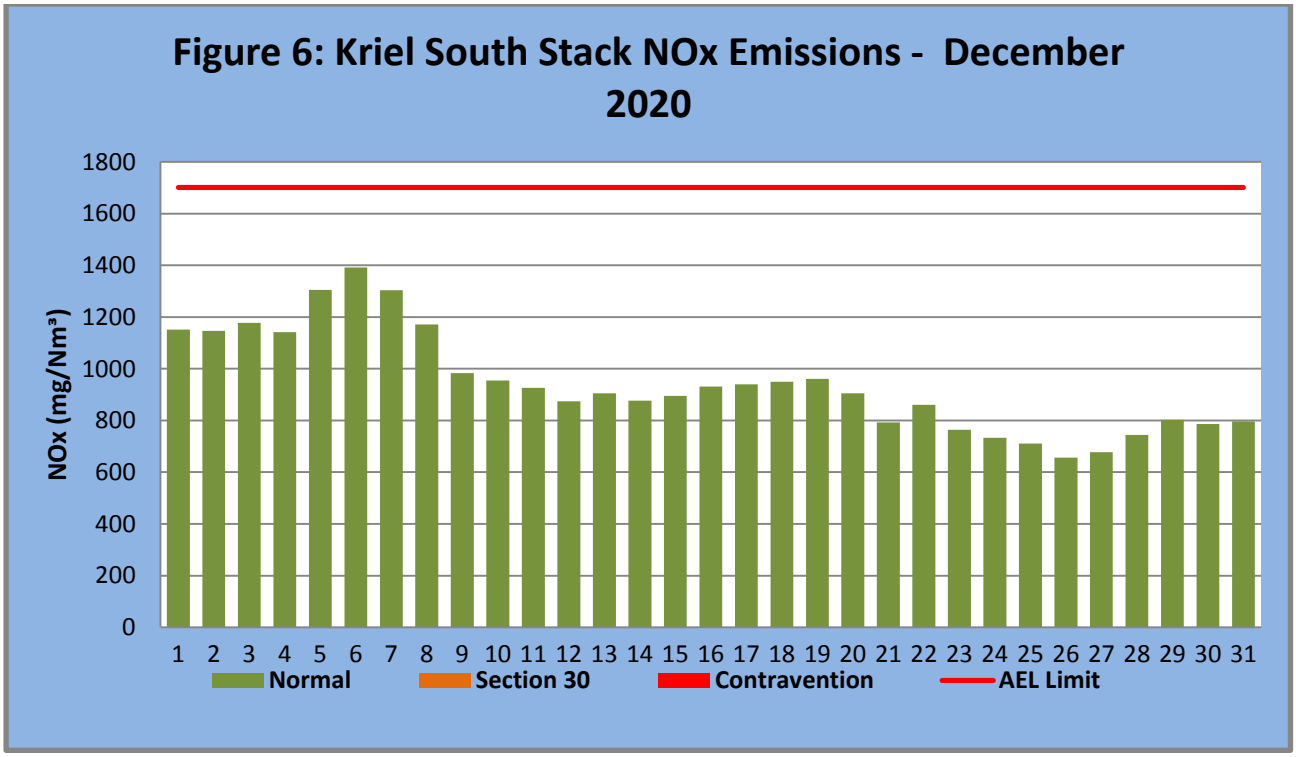

Figure 6. NO2 emissions (daily averages) for the month of December 2020 against emission limit for the South Stack. The NOx Limit is 1600mg/Nm3.

Table 4: Monthly tonnages for the month December 2020

Unit	PM (tons)	SO_2 (tons)	NO_2 (tons)
SUM	667.5	7772.7	3632.3

Table 5: Each unit and respective days operating under normal operation and section 30 days respectively

Table 5.1: Operating days in compliance to PM AEL Limit - December 2020

Associated Unit/Stack	Normal	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
North	7	24	0	0	326.31
South	26	5	0	0	98.45

Table 5.2: Operating days in compliance to SOx AEL Limit - December 2020

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SOx (mg/Nm³)
North	31	0	0	0	0	1 914.5
South	31	0	0	0	0	2 080.1

Table 5.3: Operating days in compliance to NOx AEL Limit - December 2020

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
North	31	0	0	0	0	934.8
South	31	0	0	0	0	942.3

Light up information

Table 6: PM Start-up information for the month of fabricate December 2020

North Stack	No Event	
Unit No.		
Breaker Open (BO)		
Draught Group (DG) Shut Down (SD)		
BO to DG SD (duration)		
Fires in time		
Synch. to Grid (or BC)		
Fires in to BC (duration)		
Emissions below limit from BC (end date)		
Emissions below limit from BC (duration)		
South Stack	*Event 2*	
Unit No.	*Unit 4*	
Breaker Open (BO)	*1:20 AM*	*2020/12/06*
Draught Group (DG) Shut Down (SD)	*DG did not trip or SD*	*DG did not trip or SD*
BO to DG SD (duration)	*n/a*	DD:HH:MM
Fires in time	*1:20 AM*	*2020/12/06*
Synch. to Grid (or BC)	*1:10 PM*	*2020/12/06*
Fires in to BC (duration)	*00:11:50*	DD:HH:MM
Emissions below limit from BC (end date)	*not > limit*	*not > limit*
Emissions below limit from BC (duration)	*n/a*	DD:HH:MM

Complaints Register

There was one complaint received on the 17th of December 2020 from the residents staying adjacent to Vaalpan Dam regarding dust fallout from Kriel and Matla Power Stations polluting their drinking water resource (in the uncovered reservoir). In a meeting attended by Kriel Power Station's Risk & Assurance Manager, Environmental Manager and Senior Environmental Advisor; the two complainants from Vaalpan indicated that they had experienced a significant amount of dust fallout around their settlement particularly on the 15th and 16th of December 2020. The R&A manager highlighted to the complainants that the station had been battling with an upset condition which resulted into major emission of the north stack's PM10 emissions hence their unfortunate experience. In the meeting, Eskom representatives committed to visit the settlement to assess the impact; upon the assessment, it was found that their reservoir was indeed having traces of dust (ash). It could not however be confirmed if ever the dust was strictly from Kriel Power Station because the settlement is located right in the middle and relatively close to both Kriel and Matla Power Stations. Refer to table below for more detail.

Table 9: Complaints for the month of December 2020

Source Code/ Name	Root Cause Analysis	Calculation of Impacts/ emissions associated with the incident	Dispersion modeling of pollutants where applicable	Measures implemented to prevent reoccurrence	Date by which measure will be implemented
RG0001 (Stack 1)	Failure of 11KV overhead line due development of hotspot on the conductor	Daily average around 700mg/Nm3	N/A	Repair of defective 11KV overheard lines & restore high emissions to levels below the licenced limit.	**Done**
				Install & connect the drinking water tank for residents.	**Done**

General

The particulate matter (PM10) emissions on the south common stack were within the **monthly limit**, whereas the North Stack exceeded the **monthly limit** during the month of December 2020 due to an emergency incident. North stack recorded the monthly PM10 average figure of **326.31mg/Nm3** while south stack recorded PM10 monthly average figure of **98.45 mg/Nm3**. The gaseous (NOx & SOx) emissions on both the north and south common stack were also within the **daily limit** during the month of December 2020; refer to graphs above.

NB: North Stack's PM10 monitor fell short of the legal threshold in terms of availability; the monitor availability was around 76%. The aforementioned monitor issue was caused by events of high emissions which have been explained above; thus, when the emissions reading exceed 400mg/Nm3, the monitor reliability also becomes compromised. .

<u>North Stack – PM Exceedance</u>

- On Monday, the 7th of December 2020 (at around 04:15), a gradual increase on north stack's emissions performance resulting into particulate matter emissions averaging above the legal limit of 125mg/Nm3 was observed.
- On the 8th of December 2020, Operating Department then noted that an increase in PM10 emissions was caused by ash transportation backlog as conveyor belt 18A & 18B were not running because of unavailability of ash conditioning and sluicing water.
- Still on the 8th of December 2020, it was also discovered that the unavailability of ashing water was caused by a defective 11KV overhead Power Line. Operating Department then called Electrical Maintenance to address the defective power line.

- On the 9th of December 2020, Maintenance Department discovered that the power line tripped due to the open circuit which was on red-phase. NB: This line was recently maintained earlier this year.
- The unavailability of the 11KV overhead power line resulted into an abrupt cut of ashing water supply and then stoppage of ash disposal to the ash dam; as a result, ash backlog and eventual high hopper levels were experienced at the running northern units (unit 1& 2). This incident resulted into poor Electrostatic Precipitator's (ESP) fields performance as stuck hammers were also wedged by excessive ash ; this resulted into high emissions at unit 1 and 2 (north stack).
- The faulty 11KV overhead Power Line was fixed on Friday the 11th of December 2020.
- On the 13th of December 2020, Unit 1 was shut down in order to clear the high hopper levels and also fix any damaged EPS components as a result of the incident.
- On the 17th of December 2020, Unit 2 was also shut down for the same reason of clearing the high hopper levels and also to fix defective ESP components.
- On the 19th of December 2020 (at around 05:42), daily PM10 emissions figure for north stack was averaging at 115mg/Nm3; this was attesting to the effectiveness of measures implemented to curb against high emissions.

NB: The rest of the information demonstrating compliance with the emission license conditions is supplied in the annual emission reports sent to your office.

Kriel Power Station's List of NEMA Section 30 Incidents for 2020/2021 Financial Year

Month	Description of Section30 Incidents - including the reference number	Root Cause (s)	Status of S30 Incident with DEFF (open or closed)	Remarks
April - 2020	No section 30 incident reported.			No event to report.
May - 2020	No section 30 incident reported.			No event to report.
June - 2020	No section 30 incident reported.			No event to report.
July - 2020	No section 30 incident reported.			No event to report.
Aug - 2020	Upset condition in unit 4, 5&6 exceeded 48 hours grace period. Section 30 compiled in terms of Section 7.3.2 Kriel's Atmospheric Emissions License	High hopper levels and ash transportation backlog at Unit 5 due to MCB	Open	1 Event reported
Sep - 2020	No section 30 incident reported.			No event to report.
Oct - 2020	No section 30 incident reported.			No event to report.
Nov - 2020	No section 30 incident reported.			No event to report.
Dec - 2020	Upset conditions in unit 1 & 2 exceeded 48hours grace period	Failure of 11KV overhead line due development of hotspot on the conductor.	Open	1 Event reported
Jan - 2021				
Feb - 2021				
Mar - 2021				